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(54)【考案の名称】　仕上げバイトのチップ

(57)【要約】

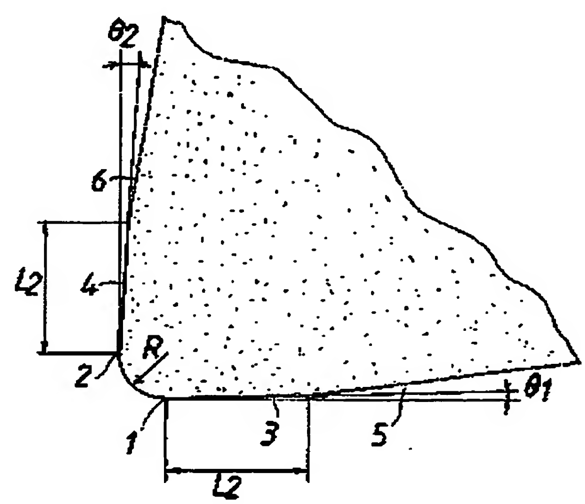
【目的】　一個のチップにより外径と同時に端面も加工できると共に、仕上げ面が良好な仕上げができることを目的とする。

【構成】　多角形状の板状体で、ノーズRの両端の仕上げ点１・２から両側の側面をサラエ刃面３・４に形成し、サラエ刃面３・４の終端に逃げ面５・６をそれぞれ連設し、サラエ刃面３・４の長さをL_1・L_2とし、サラエ刃面３・４の直角から内側に入り込む入り込み角をそれぞれθ_1・θ_2とし、

0.02mm≦L_1≦0.2mm、0.02mm≦L_2≦0.2mm、

$0\leqq\theta_1\leqq1°$、　　$0\leqq\theta_2\leqq1°$、

に設定した仕上げバイトのチップである。



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【実用新案登録請求の範囲】

【請求項1】 多角形状の板状体で、ノーズRの両端の仕上げ点1・2から両側の側面をサラエ刃面3・4に形成し、サラエ刃面3・4の終端に逃げ面5・6をそれぞれ追設し、サラエ刃面3・4の長さをL_1・L_2とし、サラエ刃面3・4の直角から内側に入り込む入り込み角をそれぞれθ_1・θ_2とし、

$0.02mm \leqq L_1 \leqq 0.2mm$、$0.02mm \leqq L_2 \leqq 0.2mm$、

$0 \leqq \theta_1 \leqq 1^\circ$、 $0 \leqq \theta_2 \leqq 1^\circ$、

に設定した仕上げバイトのチップ。

【図面の簡単な説明】

【図1】本考案の具体的一実施例の要部拡大平面図である。

【図2】本考案のチップで切削した被削材の外径と端面の表面粗さ曲線である。

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【図3】先行技術のチップの要部拡大平面図である。

【図4】外径と端面の加工部分を箱体の正面図である。

【図5】従来のチップの要部拡大平面図である。

【図6】従来のチップで切削した被削材の外径と端面の表面粗さ曲線である。

【図7】L_1，L_2＝0.01mmとした時のチップで切削した被削材の外径の表面粗さ曲線である。

【図8】L_1，L_2＝0.03mmとした時のチップで切削した被削材の外径の表面粗さ曲線である。

【符号の説明】

R…ノーズ

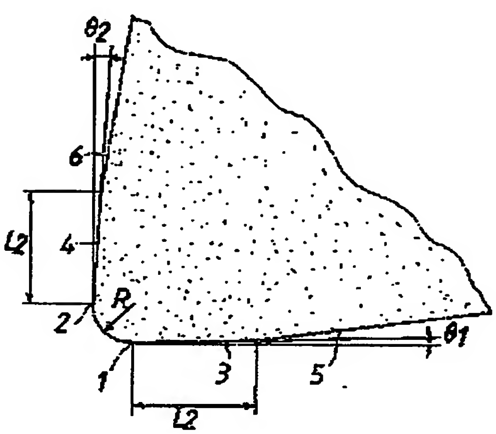
1・2…仕上げ点

3・4…サラエ刃面

L_1・L_2 …サラエ刃面3・4の長さ

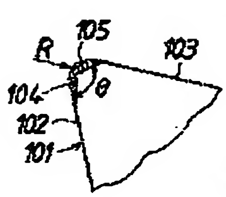
θ_1・θ_2 …サラエ刃面3・4の入り込み角

【図1】

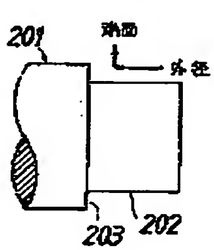


【図2】

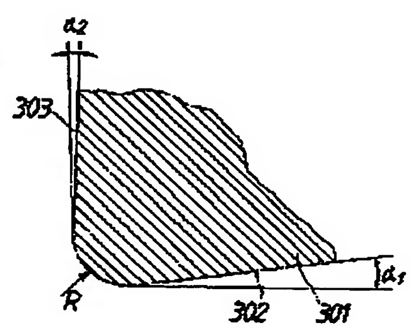
【図3】



【図4】



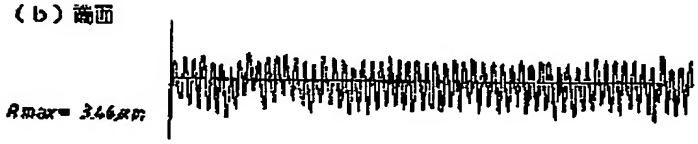
【図5】



【図6】

(a) 外径

(b) 端面



【図7】

【図8】

【考案の詳細な説明】

【0001】

【産業上の利用分野】

本考案は、仕上げバイトのチップに関するものである。

【0002】

【従来の技術】

図5に示すように、従来の仕上げバイトのチップ301は、側面302、側面303との連設部のノーズR部に角度α_1、α_2を形成し、ノーズR部と側面との接合点が仕上点となっている。

このような従来チップ301で切削した外径202および側面203の表面粗さ曲線は図6に示すとおりで、外径202で最大粗さ$R_{max}=5.18\mu m$、端面203の最大粗さ$R_{max}=3.44\mu m$であった。

【0003】

【考案が解決しようとする課題】

仕上げ面粗度を向上させる先行技術として特公昭57−42442号が公知である。

しかし、図3に示すように、この技術のチップ101は、多角形状の板状体で、側面102と側面103との連設部のノーズR部に角度θの切刃104・105を形成している。この角度θはノーズR部に形成するため通常90°以上に形成されている。

【0004】

このチップ101で、図4に示すような軸体201の外径202および端面203を切削加工する場合、このチップ101の切刃104で外径202を切削加工し、引き続いて端面203を切刃105で切削しようとすると、角度θが鈍角の90°以上であるため、端面203に干渉して切削できないので、チップ101を取り替えてから加工しなければならない欠点がある。

【0005】

【課題を解決するための手段】

そこで、本考案は、上記の事情に鑑み、一個のチップにより外径と同時に端面も加工できると共に、仕上げ面が良好な仕上げができるようにすべく、多角形状の板状体で、ノーズRの両端の仕上げ点1・2から両側の側面をサラエ刃面3・

4に形成し、サラエ刃面3・4の終端に逃げ面5・6をそれぞれ連設し、サラエ刃面3・4の長さをL_1・L_2とし、サラエ刃面3・4の直角から内側に入り込む入り込み角をそれぞれθ_1・θ_2とし、

$0.02mm \leqq L_1 \leqq 0.2mm$ 、$0.02mm \leqq L_2 \leqq 0.2mm$ 、

$0 \leqq \theta_1 \leqq 1°$ 、　　$0 \leqq \theta_2 \leqq 1°$ 、

に設定したものである。

【0006】

【作用】

チップのノーズRの両側のサラエ刃面3・4のなす角度は90° 以下に設定されており、1個のチップで外径を切削した後、引き続いて端面の切削加工ができる。

また、ノーズRと逃げ面5・6との間に、サラエ刃面3・4を設けたため、仕上げ点1・2の切削する前に被削材表面の凹凸を押え込むから仕上げ面の粗度が良くなる。

【0007】

【実施例】

本考案を添付する図面の図1・図2に示す具体的一実施例に基づいて以下詳細に説明する。

一個のチップにより外径と同時に端面も加工できると共に、仕上げ面が良好な仕上げができるようにすべく、多角形状の板状体で、ノーズRの両端の仕上げ点1・2から両側の側面をサラエ刃面3・4に形成し、サラエ刃面3・4の終端に逃げ面5・6をそれぞれ連設し、サラエ刃面3・4の長さをL_1・L_2とし、サラエ刃面3・4の直角から内側に入り込む入り込み角をそれぞれθ_1・θ_2とし、

$0.02mm \leqq L_1 \leqq 0.2mm$ 、$0.02mm \leqq L_2 \leqq 0.2mm$ 、

$0 \leqq \theta_1 \leqq 1°$ 、　　$0 \leqq \theta_2 \leqq 1°$ 、

に設定した。

【0008】

チップのノーズRの両側のサラエ刃面3・4のなす角度は90° 以下に設定されており、1個のチップで外径を切削した後、引き続いて端面の切削加工ができる

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また、ノーズRと逃げ面5・6との間に、サラエ刃面3・4を設けたため、仕上げ点1・2の切削する前に被削材表面の凹凸を押え込むから仕上げ面の粗度が良くなる。

【0009】

材質S45Cの段付ワークに対して、回転数2000rpm、送り0.02mm/rev.、切込み0.3mm湿式で加工を行った。

このようなチップで切削した外径および端面の表面粗さ曲線は図2に示すとおり、外径で最大粗さ$R_{max}=2.26\mu m$、端面で最大粗さ$R_{max}=1.98\mu m$であり、図6に示す従来の表面粗さより良くなっていることが理解できる。なお、図2と図6とは同一のスケールで表現されている。

【0010】

なお、図1に示すL_1，L_2の値が、L_1，$L_2=0.01mm$の場合、図6のようにサラエ刃の効果は期待できない。

一方、図7のようにL_1，$L_2=0.3mm$の場合、サラエ刃効果が大きいため逆に仕上げ面にビビリが発生して面状態を悪くする。

【0011】

【考案の効果】

本考案は上述のように、多角形状の板状体で、ノーズRの両端の仕上げ点1・2から両側の側面をサラエ刃面3・4に形成し、サラエ刃面3・4の終端に逃げ面5・6をそれぞれ連設し、サラエ刃面3・4の長さをL_1・L_2とし、サラエ刃面3・4の直角から内側に入り込む入り込み角をそれぞれθ_1・θ_2とし、

$0.02mm \leqq L_1 \leqq 0.2mm$、$0.02mm \leqq L_2 \leqq 0.2mm$、

$0 \leqq \theta_1 \leqq 1°$、　$0 \leqq \theta_2 \leqq 1°$、

に設定したものであり、一個のチップで外径と端面との加工ができ、サラエ刃面3・4で被削材の凹凸を押えつけてから切削するので、表面粗さが良くなった。

Japanese Utility Model Application Laid-Open No. H5-53804

[Title of the Invention] Tip for Finishing Turning Tool

[Claim]

[Claim 1] A tip for a finishing turning tool, wherein the tip is formed of a polygonal plate-shaped member; side surfaces extending from finishing points 1 and 2 located at opposite ends of a nose R are formed to serve as flat drag surfaces 3 and 4, respectively; flanks 5 and 6 are extended from the respective ends of the flat drag surfaces 3 and 4; and when the lengths of the flat drag surfaces 3 and 4 are represented by L_1 and L_2, respectively, and inward inclination angles at which the flat drag surfaces 3 and 4 are inclined with respect to mutually perpendicular lines are represented by θ_1 and θ_2, the values of L_1, L_2, θ_1, and θ_2 are set as follows:

$0.02\ \text{mm} \leq L_1 \leq 0.2\ \text{mm}$, $0.02\ \text{mm} \leq L_2 \leq 0.2\ \text{mm}$,

$0 \leq \theta_1 \leq 1°$, and $0 \leq \theta_2 \leq 1°$.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a tip for a finishing turning tool.

[0002]

[Prior Art]

As shown in FIG. 5, in a conventional tip 301 for a finishing turning tool, side surfaces 302 and 303 are

continuous with a nose R while forming angles α_1 and α_2 with tangent extensions of the nose R, respectively; and the boundaries between the side surfaces and the nose R s rve as finishing points.

FIG. 6 shows surface roughness profiles of an outer circumferential surface 202 and a shoulder end surface 203 cut by use of the conventional tip 301. The maximum roughness R_{max} of the outer circumferential surface 202 was 5.18 μm, and the maximum roughness R_{max} of the shoulder end surface 203 was 3.44 μm.

[0003]

[Problems to be Solved by the Invention]

Japanese Patent Publication (*kokoku*) No. S57-42442 discloses a prior-art technique for improving finish surface roughness.

However, as shown in FIG. 3, a tip 101 according to this technique is formed of a polygonal plate-like member; and cutting edges 104 and 105 of an angle θ are formed at a nose R which connects side surfaces 102 and 103. In general, the angle θ is set to 90° or more, because the cutting edges are formed at the nose R.

[0004]

When an outer circumferential surface 202 and a shoulder end surface 203 of a shaft member 201 as shown in FIG. 4 is cut by use of the tip 101, the outer circumferential surface 202 is first cut by use of the cutting edge 104 of the tip 101, and the shoulder end surface

203 is then cut by use of the cutting edge 105 of the tip 101. However, the angle θ is an obtuse angle; i.e., 90° or more, and therefore interference with the shoulder end surface 203 prevents cutting of the shoulder end surface 203. Therefore, the shoulder end surface 203 must be machined after changing the tip 101.

[0005]

[Means to Solve the Problems]

In view of the forming, the present invention enables simultaneous machining of a cylindrical outer surface and a shoulder end surface by use of a single tip and enables finishing to provide a well-finished surface. The tip is formed of a polygonal plate-shaped member. Side surfaces extending from finishing points 1 and 2 located at opposite ends of a nose R are formed to serve as flat drag surfaces 3 and 4, respectively; and flanks 5 and 6 are extended from the respective ends of the flat drag surfaces 3 and 4. When the lengths of the flat drag surfaces 3 and 4 are represented by L_1 and L_2, respectively, and inward inclination angles at which the flat drag surfaces 3 and 4 are inclined with respect to mutually perpendicular lines are represented by θ_1 and θ_2, the values of L_1, L_2, θ_1, and θ_2 are set as follows:

$0.02\ \text{mm} \leq L_1 \leq 0.2\ \text{mm}$, $0.02\ \text{mm} \leq L_2 \leq 0.2\ \text{mm}$,

$0 \leq \theta_1 \leq 1°$, and $0 \leq \theta_2 \leq 1°$.

[0006]

[Action]

Since the angle formed between the flat drag surfaces 3

and 4 provided on opposite sides of the nose R of the tip is set to 90° or less, by use of a single tip, cutting of a shoulder end surface can be performed after an outer circumferential surface is cut.

Further, since the flat drag surfaces 3 and 4 are provided between the nose R and the flanks 5 and 6, the irregularity of a surface of a workpiece is suppressed before cutting is effected at the finishing portions 1 and 2, whereby roughness of a finished surface is improved.

[0007]

[Embodiment]

The present invention will be described in detail on the basis of an embodiment shown in FIGS. 1 and 2.

In order to enable simultaneous machining of a cylindrical outer surface and a shoulder end surface by use of a single tip and enable finishing to provide a well-finished surface, the tip is formed of a polygonal plate-shaped member in the following manner. Side surfaces extending from finishing points 1 and 2 located at opposite ends of a nose R are formed to serve as flat drag surfaces 3 and 4, respectively; and flanks 5 and 6 are extended from the respective ends of the flat drag surfaces 3 and 4. When the lengths of the flat drag surfaces 3 and 4 are represented by L_1 and L_2, respectively, and inward inclination angles at which the flat drag surfaces 3 and 4 are inclined with respect to mutually perpendicular lines are represented by θ_1 and θ_2, the values of L_1, L_2, θ_1, and θ_2 are set as follows:

$0.02\ mm \le L_1 \le 0.2\ mm$, $0.02\ mm \le L_2 \le 0.2\ mm$,

$0 \le \theta_1 \le 1°$, and $0 \le \theta_2 \le 1°$.

[0008]

Since the angle formed between the flat drag surfaces 3 and 4 provided on opposite sides of the nose R of the tip is set to 90° or less, by use of a single tip, cutting of a shoulder end surface can be performed after an outer circumferential surface is cut.

Further, since the flat drag surfaces 3 and 4 are provided between the nose R and the flanks 5 and 6, the irregularity of a surface of a workpiece is suppressed before cutting is effected at the finishing portions 1 and 2, whereby roughness of a finished surface is improved.

[0009]

An S45C workpiece having a shoulder portion was machined in a wet condition (rotational speed: 2000 rpm, feed rate: 0.02 mm/rev., depth of cut: 0.3 mm).

FIG. 2 shows surface roughness profiles of an outer circumferential surface and a shoulder end surface cut by use of the above-described tip. The maximum roughness R_{max} of the outer circumferential surface is 2.26 μm, and the maximum roughness R_{max} of the shoulder end surface is 1.98 μm, which are understood to be improved from the conventional surface roughness shown in FIG. 6. Note that FIG. 2 and FIG. 6 are depicted at the same scale.

[0010]

Notably, when the values of L_1 and L_2 shown in FIG. 1

are each 0.01 mm, as shown in FIG. 6, the effect of the flat drag surfaces cannot be expected.

Meanwhile, when the values of L_1 and L_2 are each 0.3 mm, as shown in FIG. 7, the effect of the flat drag surfaces is excessive, and chatter is generated at the finished surface, thereby deteriorating the surface condition.

[0011]

[Effects of the Invention]

As described above, the present invention is characterized in that a tip is formed of a polygonal plate-shaped member, that side surfaces extending from finishing points 1 and 2 located at opposite ends of a nose R are formed to serve as flat drag surfaces 3 and 4, respectively, that flanks 5 and 6 are extended from the respective ends of the flat drag surfaces 3 and 4; and that when the lengths of the flat drag surfaces 3 and 4 are represented by L_1 and L_2, respectively, and inward inclination angles at which the flat drag surfaces 3 and 4 are inclined with respect to mutually perpendicular lines are represented by θ_1 and θ_2, the values of L_1, L_2, θ_1, and θ_2 are set as follows:

$0.02 \text{ mm} \le L_1 \le 0.2 \text{ mm}$, $0.02 \text{ mm} \le L_2 \le 0.2 \text{ mm}$,

$0 \le \theta_1 \le 1°$, and $0 \le \theta_2 \le 1°$.

Therefore, an outer circumferential surface and a shoulder end surface can be cut by use of a single tip. Further, since cutting is performed after surface irregularity of a workpiece is decreased by the flat drag surfaces 3 and 4, surface roughness is improved.

[Brief Description of the Drawings]

[FIG. 1]

Enlarged plan view of a main portion of an embodiment of the present invention.

[FIG. 2]

Surface roughness profiles of an outer circumferential surface and a shoulder end surface of a workpiece cut by use of the tip of the present invention.

[FIG. 3]

Enlarged plan view of a main portion of a tip according to a prior art technique.

[FIG. 4]

Front view of a shaft member having an outer circumferential surface and a shoulder end surface to be machined.

[FIG. 5]

Enlarged plan view of a main portion of a conventional tip.

[FIG. 6]

Surface roughness profiles of an outer circumferential surface and a shoulder end surface of a workpiece cut by use of the conventional tip.

[FIG. 7]

Surface roughness profile of an outer circumferential surface of a workpiece cut by use of a tip formed in such a manner that L_1, L_2 = 0.01 mm.

[FIG. 8]

Surface roughness profile of an outer circumferential surface of a workpiece cut by use of a tip formed in such a manner that L_1, L_2 = 0.03 mm.

[Description of Reference Numerals]

R: nose

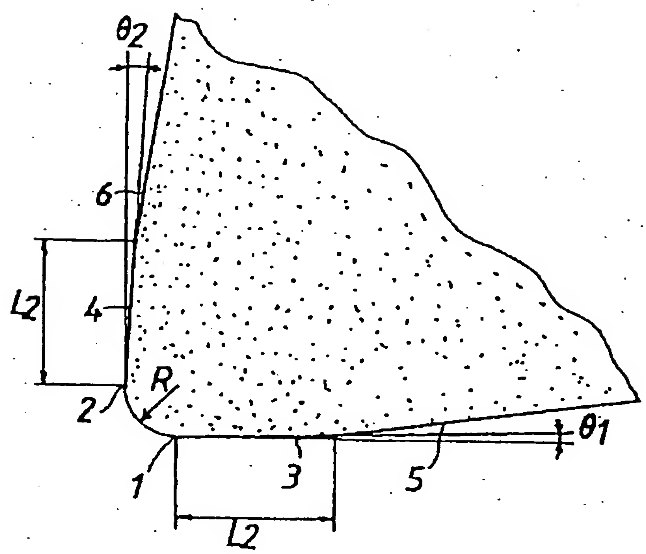
1, 2: finishing points

3, 4: flat drag surfaces

L_1, L_2 : lengths of the flat drag surfaces 3 and 4

θ_1, θ_2 : inward inclination angles of the flat drag surfaces 3 and 4

[FIG. 1]

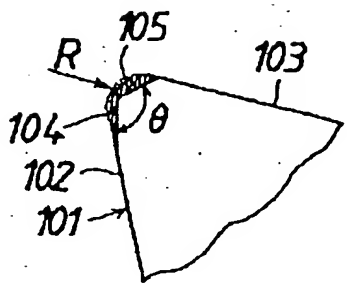


[FIG. 2]

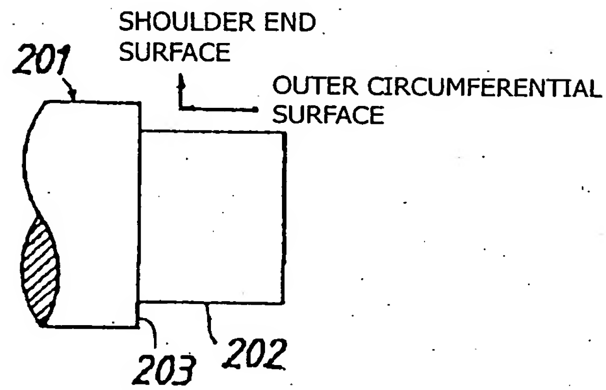
(a) OUTER CIRCUMFERENTIAL SURFACE

(b) SHOULDER END SURFACE

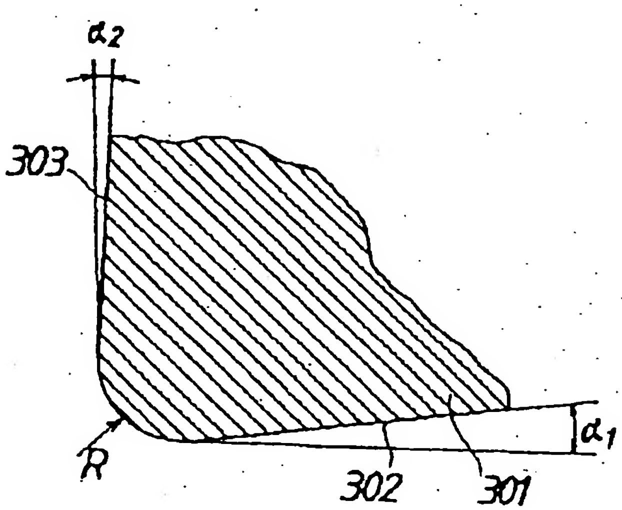
[FIG. 3]



[FIG. 4]

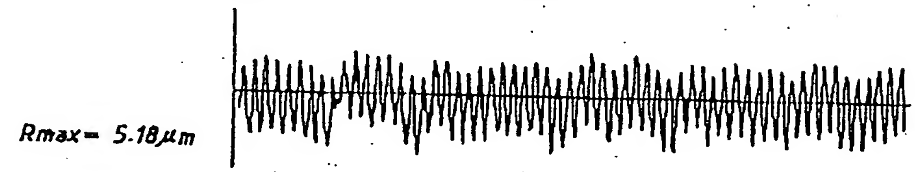


[FIG. 5]

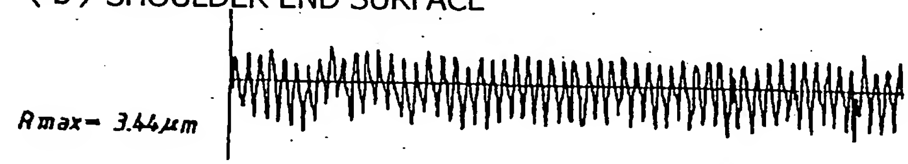


[FIG. 6]

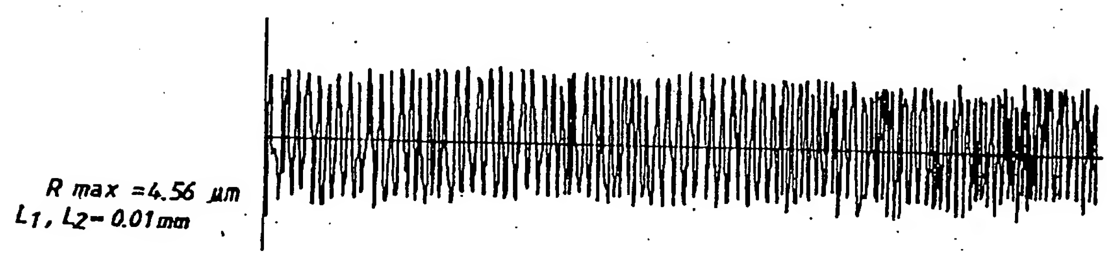
(a) OUTER CIRCUMFERENTIAL SURFACE



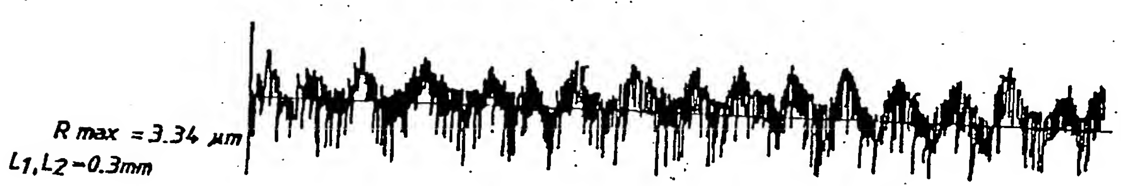
(b) SHOULDER END SURFACE



[FIG. 7]



[FIG. 8]



[Document Name] ABSTRACT

[Abstract]

[Objective] To enable simultaneous machining of a cylindrical outer surface and a shoulder end surface by use of a single tip and enable finishing to provide a well-finished surface.

[Constitution]

A tip for a finishing turning tool is formed of a polygonal plate-shaped member; side surfaces extending from finishing points 1 and 2 located at opposite ends of a nose R are formed to serve as flat drag surfaces 3 and 4, respectively; flanks 5 and 6 are extended from the respective ends of the flat drag surfaces 3 and 4; and when the lengths of the flat drag surfaces 3 and 4 are represented by L_1 and L_2, respectively, and inward inclination angles at which the flat drag surfaces 3 and 4 are inclined with respect to mutually perpendicular lines are represented by θ_1 and θ_2, the values of L_1, L_2, θ_1, and θ_2 are set as follows:

$0.02\ \text{mm} \le L_1 \le 0.2\ \text{mm}$, $0.02\ \text{mm} \le L_2 \le 0.2\ \text{mm}$,

$0 \le \theta_1 \le 1°$, and $0 \le \theta_2 \le 1°$.